

Application No. 10/019,904
Paper Dated: June 26, 2009
In Reply to USPTO Correspondence of December 29, 2008
Attorney Docket No. 3305-012184

REMARKS

The Declaration Under 37 C.F.R. § 1.131 filed on September 24, 2008 was deemed ineffective to overcome the Parsons et al. patent because the Declaration did not supply the steps of the method of claim 1, at least. In response, Applicants submit the accompanying Declaration Under 37 C.F.R. § 1.131.

Claims 1, 2, 4, 7, 14, 16 and 23 stand rejected under 35 U.S.C. § 102(e) for anticipation by U.S. Patent No. 6,757,412 to Parsons et al. Claims 3, 5, 6, 8-12, 21, and 25-30 stand rejected under 35 U.S.C. § 103(a) for obviousness from the teachings of the Parsons et al. patent in view of various combinations of U.S. Patent Nos. 6,023,637 to Liu et al.; 6,081,577 to Webber; 6,216,540 to Nelson et al.; 5,533,139 to Parker et al.; and 5,692,510 to Gordon et al.

In response to the foregoing rejections, claims 1, 4, 14, 16, 25, 26, and 29 have been amended; and claim 23 has been cancelled. Support for the amendments to claims 1, 4, 14, 16, 25, 26, and 29 can be found in the specification and claims as originally filed. After the foregoing amendments and cancellation, claims 1-12, 14, 16, 21, and 25-30 are pending in the application.

The Parsons et al. patent was filed on October 19, 1999 and claims priority from U.S. Provisional Application No. 60/105,147, filed on October 21, 1998 (hereinafter "the '147 provisional application"). A copy of the '147 provisional application accompanied the Amendment filed on September 24, 2008.

In the Declaration Under 37 C.F.R. § 1.131 that accompanied the October 18, 2006 Response to the July 18, 2006 Office Action, Applicants establish that the present invention was reduced to practice prior to June of 1999. Since the Parsons et al. patent was filed on October 19, 1999 (after June of 1999), the Parsons et al. patent can anticipate the present invention only if the '147 provisional application discloses all the limitations of independent claims 1 and 14. A careful comparison of the '147 provisional application and the Parsons et al. patent, however, reveals that the Parsons et al. patent contains considerably more disclosure than the '147 provisional application

and that the '147 provisional application does not disclose all the limitations of independent claims 1 and 14. For example, without limitation, in the detailed rejection of claims 1 and 14, the Examiner alleges, among other things, that column 14, line 30 through column 16, line 20 of the Parsons et al. patent discloses a mapping of data points as gray/color values corresponding to the position of the data in the field of view. However, there is no corresponding disclosure in the '147 provisional application. Accordingly, since the '147 provisional application does not disclose the features being relied upon by the Examiner in the Parsons et al. patent, and since the subject application has an effective filing date before the filing date of the Parsons et al. patent, the Parsons et al. patent cannot anticipate or render obvious independent claims 1 and 14 of the present application, or claims 2-12, 16, and 21 dependent therefrom.

In the detailed rejection of independent claim 25, the Examiner relies upon the Parsons et al. patent as the primary reference and relies upon the Liu et al. patent as a secondary reference allegedly disclosing a number of features, some of which are not found in independent claim 25. Column 15, line 19 through column 16, line 41, and Figs. 17 and 18 of the Liu et al. patent disclose defining an output intensity window 162 comprising a range of intensity values preferably smaller than a range of intensity values in an input intensity window 155. Each increment in the output intensity window 162 is mapped to a color value in a color spectrum 156. An output intensity scaling factor, e.g., $\frac{1}{2}$, is utilized to define a range of the output intensity window 162 with respect to the range of the input intensity window 155. For example, if the input intensity window 155 has a range of 25.60 intensity increments, the output intensity window 162 is selected to have $\frac{1}{2}$ of that range or 12.80 intensity increments. Having selected the output intensity scaling factor, the output intensity window 162 is mapped to spectrum 156 as shown in Fig. 17.

With reference to Fig. 18 and with continuing reference to Fig. 17 of the Liu et al. patent, since output intensity window 162 is smaller than input intensity window 155, it is possible for output intensity window 162 to fall in any 12.80 increment range of the 25.60 increment range of

the input intensity window 155. Thus, it is possible to “slide” or adjust the output intensity window 162 up and down within the range of input intensity window 155. For example, as shown in Fig. 18, output intensity window 162 can be adjusted from a first position 162' in which it is mapped to an intensity range between 26.70 and 39.50; to a second position 162'' in which it is mapped to an intermediate intensity range between 22.00 and 35.00; and to a third position 162''' in which it is mapped to an intensity range between 13.90 and 26.60. In each case, while the intensity range to which the output window 162 is mapped is adjusted, the output window 162 continues to be mapped to the entire color spectrum 156.

Adjustment of the position of output intensity window 162, as shown in Fig. 18, is referred to as a “slicing” function due to a visual effect that is produced as a result of the adjustment. The “slicing” image can be displayed by mapping each input data value to a color in the output window 162. Importantly, the Liu et al. patent discloses that the “slicing” function is performed on a single input image, not a plurality of images.

In contrast, independent claim 25 of the present application recites a means for detecting IR radiation from each optel of an array of optels forming a field of view of the imaging apparatus. A means for controlling controls the means for detecting to selectively acquire a plurality of frames of IR radiation from the array at a like plurality of sample intervals, with each frame corresponding to the IR radiation acquired from all of the optels of the array during one sample interval. A means for determining determines plural rates of change as a function of IR radiation received by the means for detecting from the array, with each rate of change corresponding to a change of IR radiation acquired from the same optel in at least two frames. The means for determining maps each rate of change to a color or a shade of gray; and maps the color or the shade of gray of each rate of change to a position in an image corresponding to the position of the corresponding optel in the field-of-view.

The Liu et al. patent neither discloses acquiring plural frames of IR radiation nor discloses determining plural rates of change of IR radiation received by the array, with each rate of change determined for the IR radiation received by the same optel in at least two frames. Absent such disclosure, the Liu et al. patent cannot disclose, teach, or suggest mapping each rate of change to a color or shade of gray or mapping said color or shade of gray to a position in an image corresponding to the position of the corresponding optel in the field-of-view. Thus, the Liu et al. patent does not cure the deficiencies in the teachings of the '147 provisional application and the Parsons et al. patent discussed above.

Accordingly, the '147 provisional application, the Parsons et al. patent, and the Liu et al. patent, either individually or in combination, cannot render obvious independent claim 25, or claims 26-30 dependent therefrom.

Notwithstanding the fact that the Parsons et al. patent does not anticipate or render obvious independent claims 1, 14 and 25 of the present application, or claims 2-12, 16, 21, and 26-30 dependent therefrom, Applicants submit the accompanying Declaration Under 37 C.F.R. § 1.131 to antedate the Parsons et al. patent and the '147 provisional application as references against the present application.

In the attached Declaration, Mr. Victor John Yannacone, Jr. declares that the present application is the national stage application of International Application No. PCT/US00/16851, filed June 20, 2000, which claims priority from U.S. Provisional Patent Application No. 60/140,128, filed June 21, 1999 (hereinafter "the '128 provisional application").

Mr. Yannacone further declares that prior to October of 1998, he had a thermal image of an individual acquired as part of a process of correlating this thermal image with actual clinical data acquired from the individual. A copy of this thermal image acquired in accordance with the limitations of amended independent claims 1, 14, and 25 accompany the Declaration as Exhibit A.

Mr. Yannacone further declares that to acquire the thermal image accompanying the Declaration, he had an IR imaging camera, configured to receive IR radiation from an array of optical elements (optels) in a field-of-view viewable by the IR imaging camera, operating under the control of a controller acquire plural frames of IR radiation from the individual positioned in a field-of-view of the IR imaging camera. Each frame was acquired during a corresponding frame sample interval, with each frame corresponding to the IR radiation acquired from the array of optels during its frame sample interval. Mr. Yannacone further declares that he then had a workstation determine plural rates of change as a function of the IR radiation acquired from the array, with each rate of change corresponding to a change of the IR radiation received from the same optel in at least two frames. Mr. Yannacone further declares that the workstation then mapped each rate of change to a color (the original of the accompanying thermal image is in color). Mr. Yannacone further declares that the workstation then mapped the color of each rate of change to a position in an image corresponding to the position of the corresponding optel in the field-of-view.

Mr. Yannacone then declares that he had all of the limitations of independent claims 1, 14, and 25 performed prior to October of 1998.

Mr. Yannacone then declares that following the acquisition of the thermal image accompanying the Declaration prior to October of 1998 and upon realizing the potential of the invention of independent claims 1, 14, and 25 to detect angiogenesis and angiogenic activity, he prepared a draft plan to further develop and prove the efficacy of said invention. This plan, prepared prior to October of 1998, included a list of activities to be taken in support of further development and proving the efficacy of said invention. A copy of these activities, titled "How it can be done...", accompany the Declaration as Exhibit B.

Mr. Yannacone further declares that, as can be seen from the list, one of the activities was to "[g]raphically depict the rate of change of infrared radiative energy as a function of time for each site that has been previously identified as statistically significant by any protocol" (underline

added). This activity was to be accomplished by way of, among other things, the method of step (c) of independent claim 1.

Mr. Yannacone further declares that the list also includes the activities: determining “the rate of change of infrared radiative energy (first derivative) as a function of time for each site... (see claim 4)”; determining “the acceleration of change (second derivative) of infrared radiative energy as a function of time for each site... (see claim 4)”, and “develop a common graphic presentation for all of the time domain data” (see e.g., claim 1, steps (d) and (e)).

Mr. Yannacone further declares that in pursuit of the above-mentioned activities on the list between the time of the acquisition of the thermal image accompanying the Declaration prior to October of 1998 and the filing of the ‘128 provisional application, he correlated other thermal images acquired prior to October of 1998 in accordance with, among other things, the limitations of independent claims 1, 14, and 25 with actual clinical data acquired from the individuals associated with the thermal images.

Mr. Yannacone further declares that between the time of the acquisition of the thermal image accompanying the Declaration prior to October of 1998 and the filing of the ‘128 provisional application, he diligently conducted an ongoing investigation into the theory of the invention disclosed in the subject application and claimed in the claims of this Amendment in order to understand and refine the invention. This ongoing investigation included, without limitation, interviews of medical professionals and reviewing documents, such as medical, scientific and technical journals.

Mr. Yannacone further declares that during the period between the time of the acquisition of the thermal image accompanying the Declaration prior to October of 1998 and the filing of the ‘128 provisional application, there was considerable uncertainty in the scientific and medical communities concerning mammalian thermoregulatory processes and the role of the sympathetic or autonomic nervous system in mediating or modulating such processes. It was during

this period that the discovery of neoangiogenesis as the fundamental process of supplying blood to neoplastic lesions occurred and only in early 1999 was this discovery confirmed that neoangiogenic blood vessels supplying neoplastic lesions lacked any sympathetic nervous system control. This was the final element of the theoretical basis for the invention.

Mr. Yannacone declares that based on the understanding of the invention which he learned from his investigation, in or about the spring of 1999, he was in a position to fully explain the invention to patent counsel at the law firm of Webb, Ziesenheim, Logsdon, Orkin and Hanson, P.C. (now "The Webb Law Firm, P.C."). Thereafter, Mr. Yannacone declares that he reviewed a number of drafts of the '128 provisional application prepared by patent counsel prior to it being filed on June 21, 1999.

Based on the foregoing Declaration, Applicants have clearly antedated the Parsons et al. patent and the '147 provisional application with respect to all of the subject matter disclosed therein.

Notwithstanding that the Parsons et al. patent and the '147 provisional application are not prior art to the present invention, for the purpose of fully responding to the Office Action, hereinafter Applicants will respond to various rejections in the Office Action that rely on the Parsons et al. patent as though the Parsons et al. patent was valid prior art to the present invention (which it is not). Applicants' arguments for the allowance of various claims of the present application over the Parsons et al. patent, either individually or in combination with other prior art, however, is not to be construed as an admission that the Parsons et al. patent or the '147 provisional application are prior art to the present invention.

Regarding claim 4, claim 4 depends from claim 1 and includes the further limitation that determining each rate of change in step (c) includes determining a first derivative or a second derivative. In claim 1, each such value is mapped to a color or shade of gray which, in turn, is mapped to a position in an image corresponding to the position of the corresponding optel in the

field-of-view. As noted above, the '147 provisional application does not disclose, teach or suggest mapping values to colors or shades of gray. Pages 12 and 13 of the '147 provisional application disclose cooling models based on a double-exponential decay or a series expansion thereof. Page 15 of the '147 provisional application discloses variables that can be utilized in a differential model. However, the '147 provisional application does not disclose, teach or suggest determining a value that is a first derivative or a second derivative of the IR radiation received from the same optel in at least two frames. Accordingly, the '147 provisional application and, hence, the Parsons et al. patent, cannot anticipate claim 4 of the present application.

In the rejection of claim 11, the Examiner admits that the Parsons et al. patent in view of the Liu et al. patent fails to disclose the use of a grid. However, the Examiner alleges that the Nelson et al. patent discloses the use of a grid.

The Nelson et al. patent discloses the use of a collimator disposed on the radiation exit side of a medium between the medium and a radiation detector (see Nelson et al. patent claim 1). In contrast, claim 11 recites that thermal energy is conveyed to a patient (medium) through a grid which is positioned between the IR imaging camera and the patient. Thus, in contrast to the teachings of claim 1 of the Nelson et al. patent which discloses that radiation propagating through a medium is collimated and then detected, claim 11 recites that thermal energy is conveyed to the patient through a grid (prior to reaching the patient) and IR energy radiating from a patient is acquired. The Nelson et al. patent does not disclose, teach or suggest conveying radiation to a medium through a grid.

Accordingly, the Parsons et al., Liu et al., and Nelson et al. patents, either individually or in combination, cannot render obvious claim 11 of the present application.

In the rejection of claim 28, the Examiner admits that the Parsons et al. patent fails to disclose logarithmic image acquisition. However, the Examiner alleges that the Parker et al. patent discloses this feature.

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The Parker et al. patent is directed to detection of coating imperfections on a coated web. It is respectfully submitted that the Parker et al. patent is not even prior art to the present invention. To this end, the Parker et al. patent discloses the use of a light source 12 for supplying transmissive illumination to a moving coated support web 14 to be analyzed. The Parker et al. patent does not disclose, teach or suggest the acquisition of infrared radiation. Because the Parker et al. patent is directed to acquiring images in the visible light spectrum versus acquiring infrared radiation, there is no apparent reason to combine the teachings of the Parker et al. and Parsons et al. patents in the manner suggested by the Examiner. Since the Parker et al. patent is not prior art to the present invention, the combination of the Parsons et al. and Parker et al. patents cannot render obvious claim 28 of the present application.

CONCLUSION

Based on the foregoing Amendments and Remarks, and the accompanying Declaration Under 37 C.F.R. § 1.131, reconsideration of the objections and rejections and allowance of claims 1-12, 14, 16, 21, and 25-30 are requested.

Respectfully submitted,

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